FORUM

Saltcedar Scientists Trounce Troublesome Tree

In the 1800s, planting a hardy and attractive tree called saltcedar along newly laid railroad tracks in the vast American West seemed a good idea. This foreign plant could help prevent strong winds from carrying away the soil needed to support mile after mile of heavy tracks. Nor did anyone worry then about planting saltcedar along streambanks to stabilize them during floods.

Who could have foreseen that, in the 21st century, scientists with expertise in disciplines ranging from agronomy to zoology would be putting their heads together to discover the best ways to stymie further spread of this tree?

Now well established along creeks, streams, and rivers throughout the West, saltcedar has become a big nuisance.

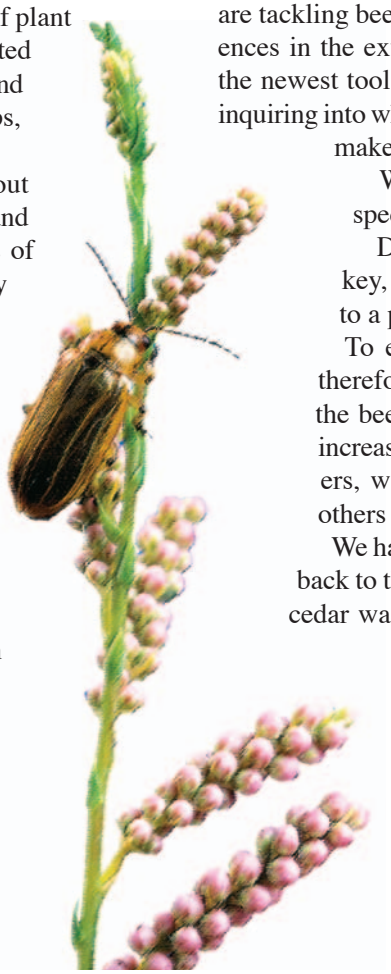
ARS scientists in more than a half-dozen laboratories—from Beltsville, Maryland, to Albany, California—and a host of collaborators are developing and testing sound, environmentally friendly methods to bring saltcedar to a halt.

Importantly, ARS's weed management studies encompass both near- and long-term perspectives. For example, we are harnessing the power and speed of computers to build mathematical models of soil and water dynamics, as well as of plant and animal communities, in saltcedar-dominated ecosystems. Models may help us to better track and judge the outcomes of our strategies and, perhaps, to fine-tune our approaches accordingly.

For example, we're interested in finding out how killing saltcedar affects small mammals and birds. If the effects can be described in terms of mathematical equations, those equations may become part of a computer-based, predictive model.

In one strategy to help restore ecosystems that today are saltcedar infested, we have fostered use of a beneficial beetle that's a saltcedar natural enemy. Beginning on page 4 of this issue, we report on our success at several sites where the beetle now lives and works. We also report our discovery of an alluring blend of scents that should help us attract the beetles—from saltcedar trees or thickets in which they're feeding or resting—for the routine census that helps us track their dispersal. It may also help us direct them where they are most needed.

The leaf beetles are the ideal first-strike weapon for some areas. For others, cultural controls or herbicides may be the best choice of several options we are testing.



Moreover, we are continuing the quest for biological control agents that might supplement and complement the beetles' work. ARS scientists in Montpellier, France, and in labs here in the United States have carefully compiled a list of about 100 potential candidates. They range from a mealybug so small that you can hardly see it to an inch-long caterpillar whose color mimics that of saltcedar leaves and helps protect the insect from hungry birds and other predators.

We are pursuing new collaborations with the National Aeronautics and Space Administration to more fully exploit the enormous potential of satellite imagery to document the beetle's progress. Even though our use of this busy biological control agent dates back only a few years, beetle damage to saltcedar is already evident from satellite imagery captured from nearly 280 miles above Earth—truly a notable success for so new a program!

The array of disciplines that we've brought to bear on the saltcedar situation is one of the greatest strengths of this collaborative campaign. For instance, we're pulling together three kinds of expertise to answer the not-so-simple question, "Is the leaf beetle just one species or many?"

Researchers who are experts in the study of insect behavior are looking for biological differences among the beetles. Others are tackling beetle morphology, checking for important differences in the external appearance of the insect. Finally, using the newest tools of gene discovery, still other researchers are inquiring into whether there are telltale differences in the genetic makeup of beetles from different locales.

Why do we need to resolve this question about species?

Differences among beetle species may prove a key, later on, to making the best match of a beetle to a particular saltcedar species or hybrid.

To everyone's credit, the number of states and, therefore, number of sites now open to us for using the beetle has more than doubled—and continues to increase. In those states and elsewhere, farmers, ranchers, water-district managers, environmentalists, and others agree: Saltcedar has worn out its welcome.

We have the benefit of 20/20 hindsight when we look back to the time—more than a century ago—when saltcedar was first seen as the ideal solution to preventing wind and water erosion. Perhaps tomorrow's scientists will look back with approval at today's campaign to tame this invasive weed.

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